

**REMARKS**

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance or into better condition for appeal. The Examiner is thanked for considering claims 80, 92 and 95 to be allowable if rewritten in independent form.

**I. STATUS OF CLAIMS AND FORMAL MATTERS**

Claims 74-97 are pending in this application. Claim 74 is amended without prejudice.

No new matter is added by this amendment.

It is submitted that these claims, as originally presented, were in full compliance with the requirements of 35 U.S.C. §112. Changes to these claims, as presented herein, are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled. Support for the amended recitation in claim 74 is found throughout the specification.

**II. 35 U.S.C. §112, FIRST PARAGRAPH, REJECTIONS**

Claims 74-97 were rejected under 35 U.S.C. §112, first paragraph, for allegedly lacking enablement. The amendment to claim 74 renders the rejection moot.

Consequently, reconsideration and withdrawal of the Section 112, first paragraph, rejection are respectfully requested.

**III. 35 U.S.C. §112, SECOND PARAGRAPH, REJECTIONS**

Claims 74-97 were rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. The amendment to claim 74 obviates the rejection.

Reconsideration and withdrawal of the Section 112, second paragraph, rejection are, therefore, respectfully requested.

#### **IV. 35 U.S.C. §103 REJECTIONS**

Claims 74-79, 81-89, 93, 94, 96 and 97 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,510,628 to Georger, Jr. et al. ("Georger") in view of U.S. Patent No. 6,061,113 to Kawata ("Kawata"); and claims 90 and 91 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Georger in view of Kawata and further in view of U.S. Patent No. 5,686,549 to Grainger et al. ("Grainger"). The rejections are traversed. The cited documents, either alone or in combination, fail to teach, suggest or provide the requisite motivation for a skilled artisan to practice the instantly claimed invention.

The instant invention is directed to a substrate structure for neurite outgrowth having a basic substrate and an alignment layer or a combined alignment layer on the basic substrate. The alignment layer is comprised of a mono- or multi-layer of liquid crystal material. The combined alignment layer, in turn, is comprised of at least one azosilane or of a polymeric material. The polymeric material in the combined alignment layer is selected from the group consisting of polyester, polypeptide, polyacrylamide, polyvinylalcohol, polyacrylate, polymethacrylate, polyurea and polyamide. The substrate structure also has at least one neuron on top of the mono- or multilayer of liquid crystal material, or on top of the combined alignment layer. The cited documents do not teach or suggest such an invention.

Applicants respectfully reiterate that Georger, either alone or in combination, fails to disclose neurite outgrowth. Nowhere in the portions of Georger cited by the Examiner is there a disclosure or suggestion of liquid crystalline material as a separate layer or in a combined alignment layer. By contrast, one of the important features of the present invention is the use of

liquid crystalline material, which allows for a reversible switching, whereby the structure on the surface of the substrate can be altered for controlling and orienting the neurite outgrowth.

Further, there is no teaching in Georger of a combined alignment layer having polymeric material selected from the group consisting of polyester, polypeptide, polyacrylamide, polyvinylalcohol, polyacrylate, polymethacrylate, polyurea and polyamide.

Kawata fails to remedy these inherent deficiencies in Georger. Kawata relates to an optical compensatory sheet having a transparent support, an orientation layer and an optically anisotropic layer in order. The optically anisotropic layer is said to contain an aligned and fixed discotic liquid crystal compound. Further, the orientation layer aligns the discotic liquid crystal compound. The sheets described in Kawata, however, are used in a liquid crystal display. Nowhere is there a teaching, suggestion or motivating recitation, however, of orienting neurite outgrowth. Nor is there a teaching or suggestion of the instantly claimed substrate structure. Thus, there is no motivation to combine the teachings of Kawata with that of Georger in order to practice the instantly claimed invention.

Grainger is equally defective. Grainger relates to a polymer attached to a substrate by anchoring chains. Applicants disagree with the Examiner's allegations that "Grainger et al. teaches that the polymer is bound ... in a predetermined alignment (pattern) as points of attachment for cell growth thus acting as an alignment layer on the substrate for cell growth." Column 15, lines 10-20, of Grainger only mentions antibodies that are attached to the polymeric article and can thus be used in analytical techniques, such as immunoassays. This clearly is not cell growth, let alone neurite outgrowth. The process of "cell growth" involves the doubling of the genetic material of a cell, followed by a subsequent cell division. In contrast thereto, and as instantly claimed, neurite outgrowth is the formation and extension of a neuron by way of

neurites, the term neurite relating to the combination of axon and dendrites. Therefore neurite outgrowth does not involve the doubling of genetic material and subsequent cell division. Grainger, therefore, is defective as evidence or unpatentability.

The Examiner has not provided a reason why a skilled artisan would be led to practice the instantly claimed invention in light of the cited documents. Instead, the Examiner appears to suggest that simply because Georger, Kawata and Grainger are allegedly analogous art, the instant invention would somehow naturally arise therefrom. This is not the standard by which to gauge patentability.

Instead, for the Section 103(a) rejection to be proper, both the suggestion and the expectation of success must be found in the prior art, and not in Applicants' own disclosure. In re Dow, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). Indeed, hindsight based on Applicants' own success as disclosed and claimed in the present application, is not a justifiable basis on which to contend that the ultimate achievement of the present invention would have been obvious at the time the invention was made. In re Fine, 5 U.S.P.Q.2d 1596, 1599, 1600 (Fed. Cir. 1988).

Further, "obvious to try" is not the standard upon which an obviousness rejection should be based. Id. And as "obvious to try" would be the only standard that would lend the Section 103 rejections any viability, the rejections must fail as a matter of law. Therefore, applying the law to the instant facts, the rejections are fatally defective and should be removed.


Consequently, reconsideration and withdrawal of the Section 103 rejections are believed to be in order and such actions are respectfully requested.

CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are patentable, and early and favorable consideration thereof is solicited.

Respectfully submitted,  
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